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EXAMINER	
STEELE, JENNIFER A	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	**Application No.** 10/552,163	**Applicant(s)** ORLANDI ET AL.	
	Examiner JENNIFER STEELE	**Art Unit** 1798	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *53-101* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *53-101* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. **Claim 53, 54, 56, 59, 66, 68, 70, 72, 74, 76, 78, 80, 85, and 91-96 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Vonfeldt et al (US 6,739,023).** The previous Office Action rejection of 8/3/2010 is maintained and presented below with the exception of the rejection over claim 72 which has been revised due to the amendment. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

Claim 53 describes a process for the production of a nonwoven, comprising the following manufacturing steps:

- *Preparing at least one layer (T_1) of splittable multicomponent polymer fibers and*

- *At least one layer of cellulose pulp fibers (T_3); and*
- *Hydroentangling said at least one layer of splittable multi-component polymer fibers and said at least one layer of cellulose pulp fibers (T_3) such as to obtain a nonwoven where the multicomponent polymer fibers are split into monocomponent microfibers entangling with one another*
    - *Wherein the <u>fibers have not been previously subjected to adhesion and/or pretreatment steps</u>.*

Gilmore is directed to a process for forming a nonwoven fabric by hydroentangling. Gilmore teaches at least one layer of textile fibers or net of polymeric filaments and at least one web of meltblown microfibers bonded together by hydroentangling (ABST).

Gilmore's process as shown in Fig. 1 a web of drawn continuous filament textile fibers can be prepared by extruding a thermoplastic polymer from extruder 12 through a plate 13 containing fine orifices into a chamber 14 where the molten fibers solidify. The fibers are strengthened by drawing them in tubes 15 filled with high velocity air. The fibers are deposited from tubes 15 onto foraminous continuous belt 16 (col. 8, lines 61-68). The continuous filaments can be bicomponent fibers (col. 5, lines 33-37). The continuous filaments can also be textile fiber such as staple fibers of cellulosic fibers (col. 6, lines 17-24).

Gilmore teaches meltblown fibers are extruded from extruder 21 through melt blowing die 22 which deposits a web onto the web of drawn continuous filaments. The two layers are then transferred to wire 18 and pass under water jet manifolds (col. 9,

lines 1-25). The water jet manifolds are equated with the hydroentangling process (col. 9, lines 67) which produces a composite fabric.

Gilmore teaches a continuous filament layer is produced and a meltblown fiber layer is deposited on the continuous filament layer and the layers are hydroentangled for form a composite fabric. While Gilmore does not explicitly teach the continuous filament layer is not bonded prior to hydroentangling with the meltblown layer, the process described and shown in Fig. 1 does not have a bonding step prior to depositing the meltblown fibers and hydroentangling the fibers together.

Gilmore differs and does not teach the continuous filaments are splittable multicomponent fibers and does not teach the meltblown fibers are pulp. Gilmore teaches a nonwoven fabric has favorable softness, dryness, tensile strength and hand (col. 2, lines 41-42). Gilmore teaches the high pressure liquid entangles the fibers such that the fibers interlock to form a fabric (col. 3, lines 24-28). Gilmore teaches a bicomponent filament which is multicomponent fiber. Gilmore teaches a meltblown fiber which is of fine denier. Gilmore also teaches embodiments of staple cellulose fibers and meltblown fibers and therefore suggests a cellulosic fiber in the web.

Vonfeldt teaches a method of forming a nonwoven composite fabric that includes the steps of providing a first layer of splittable continuous fibers, splitting the fibers into split filaments and superimposing a second layer of staple fibers and entangling the first and second layers together (ABST). Vonfeldt teaches the staple fibers are pulp fibers (col. 3, lines 50-53). Vonfeldt teaches the splittable fibers are multicomponent fibers (col. 2, lines 37-42). Vonfeldt teaches the fibers are hydroentangled (col. 2, lines 8-21).

As to claims 53 and 91, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the bicomponent filaments of Gilmore with the splittable multicomponent filaments of Vonfeldt motivated to produce a hydroentangled nonwoven composite with the softness that microfine fibers provide. It further would have been obvious to substitute pulp fibers for the meltblown fibers motivated to improve the absorbency of the nonwoven fabric.

As to claim 54, Gilmore differs and does not teach splittable filaments. Vonfeldt teaches the process of hydroentangling splits the filaments as well as entangling the filaments with the pulp.

As to claim 56, Gilmore differs and does not teach a bicomponent filament that is a splittable filament. Vonfeldt teaches splittable multicomponent fibers are produced by any known methods such as those by US 5,759,926 to Pike incorporated by reference. Vonfeldt teaches multicomponent fibers that have varying individual segments. Vonfeldt teaches the greater the number of segments, the greater the potential for forming lower denier fibers. The splittable fibers are linked to form a single multi-component fiber.

As to claim 59, Gilmore differs and does not teach splittable fibers. Vonfeldt teaches the splittable multi-component fibers can be produced from polyethylene or polypropylene, which are polyolefins, nylon 6 which is a polyamide, polyethylene terephthalate which is a polyester.

As to claims 54, 56 and 59, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ splittable multicomponent fibers

from the claimed polymers motivated to produce a nonwoven fabric with the desired strength and softness.

As to claim 66, Gilmore teaches staple cellulose fibers. Vonfeldt teaches cellulose pulp fibers and pulp fibers are equated with staple fibers (col. 3, lines 50-53).

As to claim 68, Gilmore teaches a drying step after hydroentangling (col. 10, lines 1-10).

As to claim 70, Gilmore teaches the fabric can be wound on a roll (col. 10, lines 21-24).

As to claim 72, Gilmore differs and does not teach the layer of continuous filaments is hydoentangled prior to being combined with the secondary layer of meltblown fibers. Gilmore teaches the process steps where a first layer of continuous filaments is prepared and laying a second layer of fibers on the first layer and the two layers are hydroentangled to bond together. The process of hydronentangling and bonding interlocks the fibers together. Interlocking is equated with entangling. As Gilmore differs and does not teach splittable fibers Vonfeldt teaches splittable fiber layer and a pulp layer are hydroentangled together and the splittable fibers are split and entangle with the pulp fibers. Vonfeldt teaches the layer of splittable multicomponent filaments is subjected to a hydroentangling process in order to split the multicomponent filaments prior to being hydroentangled with the layer of pulp fibers (col. 6, lines 1-38). The purpose of pre-hydroentangling the split fiber layer is to allow the full energy of the water jets to split the fibers. When the splittable web is combined with the pulp web, the pulp web absorbs some of the energy and results in lower splitting efficiency (col. 6,

lines 27-38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to pre-hydroentangle the split fiber web motivated to improve the number of fibers that are split, i.e. split efficiency.

As to claim 74, Gilmore differs and does not teach the layer of continuous filaments is hydoentangled prior to being combined with the secondary layer of meltblown fibers and therefore does not teach the pre-hydroentangled layer is dried after the pre-hydroentangled step. Vonfeldt teaches the layer of splittable multicomponent filaments is subjected to a hydroentangling process in order to split the multicomponent filaments prior to being hydroentangled with the layer of pulp fibers (col. 6, lines 1-38). The purpose of pre-hydroentangling the split fiber layer is to allow the full energy of the water jets to split the fibers. When the splittable web is combined with the pulp web, the pulp web absorbs some of the energy and results in lower splitting efficiency (col. 6, lines 27-38). Gilmore does teach that the composite fabrics are dried after hydroentangling and therefore it would have been obvious to dry the fabric after hydroentangling motivated to remove moisture from the high pressure water jets and provide a dry layer to combine with the pulp layer.

As to claim 76, 78 and 80, Gilmore teaches a drying step after hydroentangling (col. 10, lines 1-10). Gilmore teaches transporting the fabric around the surface of hot cans or a felt may be used to hold the fabric against the hot drying cans or other drying methods can also be utilized. A drying step is equated with a dewatering step as both processes remove water from the fabric. Gilmore teaches calendaring (col. 10, lines11-20) after drying but before winding the fabric on a roll.

As to claim 85, Gilmore and Vonfeldt teach the hydroentangled fibers are produced to form a nonwoven fabric. Gilmore teaches the nonwoven can be calendered and thermal bonded. These process steps are equated with a nonwoven finishing step.

As to claim 92, splittable microfibers are equated with exploded fibers. Applicant's specification teaches an exploded fiber is produced by a Laval nozzle, which is a specific process. It should be noted that even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same or an obvious variant from a product of the prior art, the claim is unpatentable even though a different process made the prior product. In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985). The burden has been shifted to the Applicant to show unobvious differences between the claimed product and the prior art product. In re Marosi, 218 USPQ 289,292 (Fed. Cir. 1983).

As to claim 93, 94 and 96, Gilmore teaches a layer of meltblown microfibers that have an average fiber diameter of 2 to 6 microns (col. 6, lines 17-24).

As to claim 95, Gilmore differs and does not teach the dtex of the microfibers. Vonfeldt teaches a layer of split fibers and a layer of staple fibers and teaches the split fibers have a denier less than about 0.7 and less than about 0.1 and less than 0.01 (col. 5, lines 1-11). A denier of less than 0.7 is equal to 0.77 dtex and in the claimed range. It would have been obvious to one of ordinary skill in the art at the time the invention

was made to employ microfibers in the claimed dtex range motivated to produce a fabric with the desired weight, softness and texture.

2. **Claim 55, 99, 100 and 101 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Vonfeldt et al (US 6,739,023) and in further view of Skoog et al (US 6,177,370).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

As to claim 55, Gilmore in view of Vonfeldt differ and do not teach a three layer nonwoven with two multicomponent layers sandwiching a pulp layer. Skoog teaches a nonwoven with synthetic fiber layers 120 and 140 with pulp layer 160 in the middle. Skoog hydroentangles the layers together to mix the fibers and produce an absorbent fabric with improved abrasion resistance and the composite requires no additional bonding after hydroentangling.

It would have been obvious to employ a secondary split fiber layer to sandwich the pulp layer motivated to produce a fabric with improved abrasion resistance while maintaining the absorbency of the nonwoven which the pulp layer layer provides.

As to claims 99 and 100, Gilmore teaches 2 layer webs with individual basis weights of 8.4 GSY, 17 GSY, 23 GSY and 36 GSY which are equivalent to 10 gsm, 21 gsm, 28 gsm and 44 gsm. The total weight of the web would be in the claimed range of 48 to 65 gsm. The basis weights of the layers are in the claimed ranges of 11-13 gsm

for the upper or lower layer and 26-29 gsm pulp layer. However Gilmore and Vonfeldt differ and do not teach a three layer laminate and does not specifically teach the pulp layer with the claimed basis weight.

Gilmore teaches the caliper of the webs which is a measure of thickness under a compression (col. 19, lines 34-39). Gilmore lists the calipers, measured in mils in Table 2 between 11 to 58 mils under 19 g/sq in compression and 8 to 32 under 131 g/sq in compression. These thicknesses are equivalent to 0.3 mm to 1.5 mm and 0.2 to 0.8 mm and in the claimed range.

Gilmore teaches it is desirable to produce a nonwoven with good tensile strength without destroying the softness and drape. Gilmore teaches the tensile strength measured by ASTM D168264 in the MD and CD directions are between 700-4909 grams per inch in the MD direction and 170 to 1425 grams per inch in the CD direction (col. 19, lines 16-25, and Table 2). Converting to N/5 cm, these values are equal to 13 to 95 N/ 5 cm in the MD direction and 3.25 to 27.5 in the CD direction and in the claimed range of Gilmore.

Skoog teaches a three layer laminate where layer 120 and 140 have basis weights of from about 12 to about 50 gsm and layer 160 of pulp fibers has a basis weight of 28 to 165 gsm (col. 4, lines 44-67).

It would have been obvious to employ the basis weights as claimed motivated to produce a three layer, absorbent laminate with the desired weight, absorbency and drape.

As to claims 101, the claim is drawn to a statement of use and does not distinguish the claims from prior art of Vonfeldt. However, Vonfeldt teaches a single or multi-layer nonwoven comprised of splittable multicomponent filaments and Vonfeldt teaches employing the splittable filaments with other layers and with absorbent materials such as cellulose pulp fibers.

3. **Claim 57 and 58 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Vonfeldt et al (US 6,739,023) and in further view of Murase et al (US 5,718,972).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

As to claim 57 and 58, Gilmore in view of Vonfeldt differ and do not teach the splittable multi-component fiber is obtained by spinning and linking up to 16 continuous threads of different polymers.

Murase teaches a nonwoven fabric made of fine denier filaments (Title). Murase teaches the nonwoven fabric is made of bicomponent conjugate filaments that are split by applying water jet needling. Murase teaches the filaments has a structure where there are 16 radial segments and a center hollow segment. The 16 radial segments would split into 16 threads. As to claim 57, Murase teaches splittable multi-component fiber is obtained by spinning and subsequently linking up to 16 continuous threads of different polymers. As to claim 58, Murase teaches the 16 radial segments would be split into the 16 thread of different polymers.

It would have been obvious to employ a splittable fiber structure as taught by Murase motivated to produce the desired fineness and fiber mixture in the nonwoven fabric.

4. **Claim 97 and 98 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Vonfeldt et al (US 6,739,023) and in further view of Everhart et al (US 5,284,703).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

As to claim 97, Gilmore teaches the basis weight of the microfiber web can be 8.4 GSY or 23 GSY or 36 GSY in examples 1 and 2-7 (col. 15, lines 38-65). Gilmore combines the meltblown microfiber web with a 17 GSY web in example 7 (col. 16, lines 9-11). The combined weight of the web in example 7 is 53 GSY or 64 gsm and in the claimed range. Vonfeldt teaches the basis weight of the splittable fiber web is about 10 to about 70 gsm (col. 5, lines 32-38). It would have been obvious to produce a microfiber web in the claimed basis weight range.

Gilmore teaches it is desirable to produce a nonwoven with good tensile strength without destroying the softness and drape. Gilmore teaches the tensile strength measured by ASTM D168264 in the MD and CD directions are between 700-4909 grams per inch in the MD direction and 170 to 1425 grams per inch in the CD direction (col. 19, lines 16-25, and Table 2). Converting to N/5 cm, these values are equal to 13

to 95 N/ 5 cm in the MD direction and 3.25 to 27.5 in the CD direction and in the claimed range of Gilmore.

Gilmore teaches a strip elongation of the fabric and presents the results in Table 2. The strip elongation is measured by ASTM D1682-64 and does not measure the elongation as claimed (col. 19, lines 27-31). As Gilmore in view of Vonfeldt teach the same materials and structure as claimed and Gilmore teaches the fabric has the property of elongation, it is reasonable to presume the property of elongation could have been optimized to achieve the desired results.

Gilmore differs and does not teach the percentage of pulp in the nonwoven fabric. Vonfeldt teaches a pulp layer however differs and does not teach the percentage of pulp in the nonwoven. Gilmore and Vonfeldt differ and do not teach the absorbency of the web as claimed.

Everhart teaches a high pulp content nonwoven composite fabric (Title). Everhart teaches a composite fabric composed of more than about 70% by weight pulp fibers which are hydraulically entangled into a continuous filament substrate (ABST). Everhart teaches the absorbent properties expressed as water wicking and oil absorbency in Tables 1, 2 and 3. Everhart teaches the water absorbent capacity percentage is 526%, 551%, 555% and 738% in Table 2 (col. 17, lines 60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the claimed percentage of pulp fibers motivated to increase the absorbency of the web.

5. **Claim 82 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Vonfeldt et al (US 6,739,023) and in further view of Midkiff et al (US 5,707,735).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

As to claim 82, Gilmore and Vonfeldt differ and do not teach the quench air temperature that is used to cool the filaments after being extruded from the spinnerette. Midkiff teaches a conjugate fiber that can be split and formed into a nonwoven fabric (col. 2, lines 1-10). Midkiff teaches the process of producing the conjugate fiber filaments are extruded from spinneret 18 and a stream of air from the quench air blower 20 at least partially quenches the filaments. The air temperature is about 45 degrees to about 90 degrees F (col. 10, lines 40-45). About 45 degrees is below room temperature.

It would have been obvious to one of ordinary skill in the art to cool the filaments with air at a temperature equal to or lower that room temperature motivated to achieve the cool the fibers quickly to reduce inadvertent bonding of molten fibers when the fibers are deposited on the conveyor.

6. **Claim 87 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Vonfeldt et al (US 6,739,023) and in further view of Murakami et al (US 4,735,849).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the

112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

Gilmore in view of Vonfeldt differ and do not teach the nonwoven comprises a multicolor printing step. Murakami teaches a nonwoven web produced from splittable fibers where the fabric is dyed by means of spray printing or multi-color printing (col. 10, lines 25-35). It would have been obvious to print or dye the fabric motivated to produce a fabric that is colorful and aesthetically pleasing.

7. **Claim 89 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Vonfeldt et al (US 6,739,023) and in further view of Hills et al (US 6,338,814).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

Gilmore in view of Vonfeldt differ from the current application and do not teach the fibers are deposited on an inclines support with an incline angle of between 10 to 50 degrees.

Hills teaches a spunbond web formation apparatus includes a spinneret that extrudes an array of fibers that are drawn into an aspirator. The attenuated fibers are discharged from the aspirator and are deflected sideways by a coada device that entrains the exiting air stream along with the fibers. The fibers are deposited on a vertically moving belt and subsequently bonded by calendar rolls (ABST). Hills teaches the fibers can be splittable fibers (col. 14, lines 51-65). Hills teaches the fibers are deposited onto a short inclined web forming belt disposed at an angle of approximately

30 degrees with respect to the vertical such that the fibers approach the belt substantially perpendicularly (col. 12, lines 11-54).

Hills presents a finding that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the processing technique of an inclined conveyor in the process of Gilmore and Vonfeldt and the results of the combination would have been predictable in producing a split fiber nonwoven fabric.

8. **Claim 60, 61, 63, 64, 65, 67, 69, 71, 77, 79, 81, 86 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Piotrowski et al (US 4,642,262).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

As to claim 60, Gilmore teaches a nonwoven fabric produced from continuous filament extruded from a spinneret and then hydroentangled into a fabric. Gilmore teaches a staple cellulose fiber can be combined with a meltblown fiber layer or a continuous filament layer can be combined with a meltblown layer and differs and does not teach an exploded fiber layer. Gilmore differs and does not teach exploded fibers. Applicant describes exploded fibers are fibers that are extruded through a Laval nozzle.

Piotrowski is directed to a method of making fibrids from thermoplastics (ABST). Fibrids are understood to be fibers with a highly oriented longitudinal direction and have a cellulose-like structure (col. 1, lines 18-22). Piotrowski teaches a method of making fibrids by extruding a thermoplastic polymer through a Laval nozzle which creates a

high velocity propulsion of the polymer solution which can contain a percentage of gaseous solvent is achieved by means of a jet of steam in a two substance mixing nozzle operating on the principle of a laval nozzle. The liquid stream is broken up and the solvent is vaporized and carried out by the steam. The fibrids are prepared into nonwovens.

As to claim 60, it would have been obvious to one of ordinary skill in the art to substitute the spinning process of Gilmore with a Laval nozzle orifice motivated to produce a fiber and resultant fabric that is cellulose-like.

As to claim 61, Gilmore teaches a staple cellulose fiber can be combined with a meltblown fiber layer or a continuous filament layer can be combined with a meltblown layer and differs and does not teach an exploded fiber layer. Piotrowski teaches an exploded fiber. It would have been obvious to substitute the meltblown layer with an exploded fiber layer motivated to produce a fabric with a fine fiber that provides softness and absorbency.

As to claim 63, Gilmore differs and does not teach an exploded fiber. Piotrowski teaches a method of making fibrids by extruding a thermoplastic polymer through a Laval nozzle which creates a high velocity propulsion of the polymer solution which can contain a percentage of gaseous solvent is achieved by means of a jet of steam in a two substance mixing nozzle operating on the principle of a laval nozzle. The liquid stream is broken up and the solvent is vaporized and carried out by the steam. The fibrids are prepared into nonwovens.

It would have been obvious to one of ordinary skill in the art to substitute the spinning process of Gilmore with a Laval nozzle orifice motivated to produce a fiber and resultant fabric that is cellulose-like.

As to claim 64 and 65, Gilmore differs and does not teach an exploded fiber. Piotrowski teaches the fibrids are produced from thermoplastics synthetics and copolymers (ABST) such as polyolefins, polyvinyl halides, polyesters, polyacrylonitrile, polyamides, polyvinyl lactam (col. 1, lines 7-15). It would have been obvious to one of ordinary skill in the art to substitute the spinning process of Gilmore with a Laval nozzle orifice motivated to produce a fiber and resultant fabric that is cellulose-like.

As to claim 67, Gilmore teaches staple cellulose fibers.

As to claim 69, Gilmore teaches a drying step after hydroentangling (col. 10, lines 1-10).

As to claim 71, Gilmore teaches the fabric can be wound on a roll (col. 10, lines 21-24).

As to claim 77, 79 and 81, Gilmore teaches a drying step after hydroentangling (col. 10, lines 1-10). Gilmore teaches transporting the fabric around the surface of hot cans or a felt may be used to hold the fabric against the hot drying cans or other drying methods can also be utilized. A drying step is equated with a dewatering step as both processes remove water from the fabric. Gilmore teaches calendaring (col. 10, lines11-20) after drying but before winding the fabric on a roll.

As to claim 86, Gilmore and Vonfeldt teach the hydroentangled fibers are produced to form a nonwoven fabric. Gilmore teaches the nonwoven can be calendered

and thermal bonded. These processes steps are equated with a nonwoven finishing step.

9. **Claim 62 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Piotrowski et al (US 4,642,262) and in further view of Skoog et al (US 6,177,370).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

Gilmore in view of Piotrowski differ and do not teach a three layer sandwich structure with a central pulp layer. Skoog teaches a nonwoven with synthetic fiber layers 120 and 140 with pulp layer 160 in the middle. Skoog hydroentangles the layers together to mix the fibers and produce an absorbent fabric with improved abrasion resistance and the composite requires no additional bonding after hydroentangling.

It would have been obvious to employ a secondary split fiber layer to sandwich the pulp layer motivated to produce a fabric with improved abrasion resistance while maintaining the absorbency of the pulp layer.

10. **Claim 73 and 75 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Piotrowski et al (US 4,642,262) and in further view of Vonfeldt et al (US 6,739,023).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the

112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

As to claim 73, Gilmore in view of Piotrowski differs and does not teach the layer of continuous filaments is hydoentangled prior to being combined with the secondary layer of meltblown fibers. Vonfeldt teaches the layer of splittable multicomponent filaments is subjected to a hydroentangling process in order to split the multicomponent filaments prior to being hydroentangled with the layer of pulp fibers (col. 6, lines 1-38).

As to claim 75, Gilmore in view of Piotrowski differs and does not teach the layer of continuous filaments is hydoentangled prior to being combined with the secondary layer of meltblown fibers and therefore does not teach the pre-hydroentangled layer is dried after the pre-hydroentangled step. Vonfeldt teaches the layer of splittable multicomponent filaments is subjected to a hydroentangling process in order to split the multicomponent filaments prior to being hydroentangled with the layer of pulp fibers (col. 6, lines 1-38).

Gilmore does teach that the composite fabrics are dried after hydroentangling and it would have been obvious to dry the fabric after hydroentangling motivated to remove moisture from the high pressure water jets and provide a dry layer to combine with the pulp layer.

11. **Claim 83 and 84 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Piotrowski et al (US 4,642,262) and in further view of Midkiff et al (US 5,707,735).** The previous Office Action rejection of

8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

As to claim 83, Gilmore and Piotrowski differ and do not teach the quench air temperature that is used to cool the filaments after being extruded from the spinnerette. and formed into a nonwoven fabric (col. 2, lines 1-10). Midkiff teaches the process of producing the conjugate fiber filaments are extruded from spinneret 18 and a stream of air from the quench air blower 20 at least partially quenches the filaments. The air temperature is about 45 degrees to about 90 degrees F (col. 10, lines 40-45). About 45 degrees is below room temperature.

It would have been obvious to one of ordinary skill in the art to cool the filaments with air at a temperature equal to or lower that room temperature motivated to achieve the cool the fibers quickly to reduce inadvertent bonding of molten fibers when the fibers are deposited on the conveyor.

As to claim 84, Gilmore and Piotrowski differ and do not teach the quench air temperature that is used to cool the filaments after being extruded from the spinnerette. Piotrowski does teach steam is used to as the gas that provides the high velocity propulsion. Steam is water vapor and therefore would humidify the fibers. The combination of Piotrowski's steam propulsion gas and the cooler quench air of Midkiff would produce a cool and humid fiber treatment prior to hydroentangling.

12. **Claim 88 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Piotrowski et al (US 4,642,262) and in further view of Murakami et al (US 4,735,849).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

Gilmore in view of Piotrowski differ and do not teach the nonwoven comprises a multicolor printing step. Murakami teaches a nonwoven web produced from splittable fibers where the fabric is dyed by means of spray printing or multi-color printing (col. 10, lines 25-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to print or dye the fabric motivated to produce a fabric that is colorful and aesthetically pleasing.

13. **Claim 90 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilmore et al (US 5,369,858) in view of Piotrowski et al (US 4,642,262) and in further view of Hills et al (US 6,338,814).** The previous Office Action rejection of 8/3/2010 is maintained and presented below. Applicant's amendments overcome the 112 1st and 2nd paragraph rejections and do not reflect changes to the claim limitations.

Glimore in view of Piotrowski differ from the current application and do not teach the fibers are deposited on an inclines support with an incline angle of between 10 to 50 degrees.

Hills teaches a spunbond web formation apparatus includes a spinneret that extrudes an array of fibers that are drawn into an aspirator. The attenuated fibers are discharged from the aspirator and are deflected sideways by a coada device that entrains the exiting air stream along with the fibers. The fibers are deposited on a vertically moving belt and subsequently bonded by calendar rolls (ABST). Hills teaches the fibers can be splittable fibers (col. 14, lines 51-65). Hills teaches the fibers are deposited onto a short inclined web forming belt disposed at an angle of approximately 30 degrees with respect to the vertical such that the fibers approach the belt substantially perpendicularly (col. 12, lines 11-54).

Hills presents a finding that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the processing technique of an inclined conveyor in the process of Gilmore and Vonfeldt and the results of the combination would have been predictable in producing a split fiber nonwoven fabric.

Response to Arguments

14. Applicant's amendments and arguments, with respect to 53-59, 66, 68, 70, 72, 74, 76, 78, 80, 82, 85, 87, 89 and 91-101 rejected under 35 U.S.C. 112, first paragraph have been fully considered and are persuasive. The 35 U.S.C. 112, first paragraph of 53-59, 66, 68, 70, 72, 74, 76, 78, 80, 82, 85, 87, 89 and 91-101 has been withdrawn. Applicant amended the independent claims 53, 60, 91 and 92 which have support for the limitation in the specification.

15. Applicant's amendments and arguments, with respect to 92, 94, 96, 98, 100 and 101 rejected under 35 U.S.C. 112, first paragraph have been fully considered and are persuasive. Claims 92, 94, 96, 98, 100 and 101 describe an exploded fiber and then claims "such as to obtain a non-woven where the multi-component polymer fibers are split into mono-component micro-fibers entangling one another". The claims have been amended to recite exploded fibers and delete split fibers.

16. Applicant's amendments and arguments, with respect to claim 56 rejected under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The claim was amended to delete (5,7,11,15).

17. Applicant's amendments and arguments, with respect to claim 72 rejected under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The claim was amended to be an independent claim and therefore the rejection of lack of antecedent basis to claim 53 is withdrawn.

18. Applicant's amendments and arguments, with respect to claim 92, 94, 96, 98, 100 and 101 rejected under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. Claim 92, 94, 96, 98, 100 and 101 were amended to remove the limitation "multicomponent polymer fibers split into mono-component micro-fibers" in lines 6 and 7 and replaced with the phrase "in which the polymer fibers are exploded into micro-fibers entangling with one another."

19. Applicant's arguments filed 12/3/2010 have been fully considered but they are not persuasive. Applicant argues that the combination of Vonfeldt and Gilmore does not teach the claimed feature of hydro-entangling splittable multicomponent fibers and pulp

fibers to form a nonwoven where the fibers have not been previous subjected to adhesion and/or pretreatment. Applicant argues that one of ordinary skill in the art would not recognize that the multi-component splittable fibers of Vonfeldt could be used in the first embodiment of Gilmore that does not include a pre-bonding step because Vonfeldt emphasizes that a pretreatment bonding step before hydroentanglement is necessary for splittable fibers. Applicant states that Vonfeldt teaches when using splittable fibers, a pre-bonding step is essential. Applicant did not cite the reference for this statement.

In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, Vonfeldt suggests that splitting and hydroentangling can be done in a single step and this results in fewer splits would be accomplished (col. 6, lines 35-39):

> If the splitting and hydroentangling were to be completed in a single step, it can be expected that fewer splits would be accomplished as the staple fibers could absorb energy that otherwise would be directed to the unsplit fibers.

Applicant argues that Vonfeldt discusses a pretreatment of thermal bond rolls to produce pin bonding, but also suggests that any form of pretreatment bonding which provides good tie down of the filaments could be used. Applicant cites Vonfeldt as teaching that a pretreatment bonding step is necessary for a coherent end product. One of ordinary skill in the art would understand that prebonding a layer of fibers would tie down the filaments or serve to hold them together. However, the primary reference to Gilmore teaches that a layer of filaments can be prepared on a foraminous surface and then a layer of meltblown fibers can be prepared on the layer of filaments. One of ordinary skill in the art also would know that a spunbonded fabric is produced by extruding spun filaments onto a foraminous surface. Applicant teaches the filaments form a spunbond nonwoven. The method of Gilmore is equated with the claimed method. The method of Gilmore does not require any pretreatment or adhesion prior to hydroentangling. As these process steps are known in the art, it is not novel or new to incorporate these steps.

While Vonfeldt teaches bonding prior to hydroentangling with the layer of pulp, Vonfeldt is relied upon for teaching splittable multi-component filaments. As Vonfeldt suggests that the splittable fibers can be split in the same process step as the hydroentangling step and Vonfeldt states that the outcome is fewer split fibers, the result of the combination of claimed process steps would have been predictable.

Applicant argues that the pretreatment bonding step of Vonfeldt is necessary for a coherent end product. This reference to Vonfeldt also includes the teaching that the degree of entanglement of the staple fibers into the split filament web is dependent on

the degree of bonding in the split filament web. If the degree of bonding is low, there the filaments are generally too mobile to form a coherent matrix to secure the staple fibers. Applicant's arguments are not commensurate with the scope of the claims. Applicant has not claimed a cohesive web or any structural limitations that describe the degree that the web is soft or rigid. Applicant's process steps encompass the process steps of Gilmore as suggested by Vonfeldt and it would have been obvious to try the combination and the results would have been predictable. The claims do not distinguish the invention from the combination of Gilmore and Vonfeldt.

20. Applicant's arguments with respect to claim 92 state that for the reasons that the rejection of Gilmore in view of Vonfeldt does not teach a nonwoven made by hydroentangling, splittable multi-component fibers and pulp fibers where the fibers have not been previously subjected to adhesion and/or pretreatment steps, the rejection over claim 92 does not teach the feature of splittable fibers. Examiner equates splittable fibers with exploded fibers. Applicant argues that as the references do not teach splittable fibers the references do not teach exploded fibers. Examiner maintains that Vonfeldt teaches splittable fibers and it is proper to combine the process of Gilmore which does not include any adhesion or pretreatment steps with the process and structure of Vonfeldt which teaches splittable fibers hydroentangled with pulp fibers. Therefore the rejection over claim 92 and dependent claims is maintained.

21. Applicant argues the rejection of claims 60, 61, 63, 64, 65, 67, 69, 71, 77, 79, 81 and 86 over Gilmore in view of Piotrowski and states that as Piotrowski does not teach a process of hydroentangling, one would not combine Piotrowski with Gilmore.

Examiner maintains that one of ordinary skill in the nonwoven fabric art would know both Piotrowski and Gilmore are directed to processes of producing nonwoven fabrics and the nonwoven fabrics and as such are analogous art. Gilmore is directed to a method of combining two extruded/spun fibrous layers by hydroentangling. Piotrowski is directed to a method of producing or extruding exploded fibers that produce a nonwoven web. While Piotrowski single layer web does not required hydroentangling, Piotrowski is relied upon for teaching the process step of using a Laval nozzle is known. Therefore it would have been obvious to combine known process steps motivated to produce a multilayer nonwoven fabric. Both references teach known techniques for producing nonwoven fabrics. The burden is on the Applicant to provide evidence that the results of the combination produce an unexpected result.

22. Applicant argues the rejection of claims 73 and 75 stating that Vonfeldt taches that the hydroentangling step occurs <u>during</u> the preparation of the layer and claim 73 requires the pre-hydroentangling step <u>after</u> said step of preparing the layer. According to Applicant's specification and the description of the process shown in Fig. 1C which has a step of prehydroentangling the T1 layer, it is understood that preparing the layer encompasses spinning the fibers which are laid down on a surface or belt S. Vonfeldt teaches the splittable filaments are produced by known methods such as continuous filament extrusion processes including spinning the fibers. The splittable fibers are on a surface to form a layer as shown in Fig. 1 of Vonfeldt. Vonfeldt's prepared splittable fiber layer is equated with Applicant's prepared layer. Then the fibers are split by hydroentangling and subsequently hydroentangled again with the pulp layer.

Applicant argues that Vonfeldt is directed to a process for using pre-hydro-entanglement to create a splittable multi-component layer and in contrast claim 73 is directed to a process using exploded fibers in layer which no not require the hydroentangling machine required by Vonfeldt. Examiner maintains that Vonfeldt teaches the process steps of prehydroentangling a single layer and then hydroentangling two layers together. Examiner maintains it would have been obvious to combine this technique with the exploded fiber web of Piotrowski and two layer web of Gilmore which are bonded together by hydroentangling.

23. Applicant's arguments with respect to claim 72 are the same as the arguments with respect to claims 73 and 75. Applicant argues that the pre-hydroentangling step takes place after the layer of splittable multi-component fibers has been prepared. This process is equivalent to the process taught by Vonfeldt as noted in paragraph 22 above. The rejection is maintained.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER STEELE whose telephone number is (571)272-7115. The examiner can normally be reached on Office Hours Mon-Fri 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571) 272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. S./ /Angela Ortiz/

Examiner, Art Unit 1798

Supervisory Patent Examiner, Art Unit 1798

2/10/2011